



# **RAPID RIVER HATCHERY**

**1990 Chinook Brood Year Report**



by

**Tom Levendofski, Fish Hatchery Superintendent III**

**Brad Dredge, Fish Hatchery Superintendent I**

**Steve Kammeyer, Fish Culturist**

**February 1992**

## TABLE OF CONTENTS

	<u>Page</u>
ABSTRACT .....	1
INTRODUCTION .....	2
LOCATION .....	2
OBJECTIVES .....	2
FISH REARING/HOLDING FACILITIES .....	2
WATER SUPPLY .....	4
STAFFING .....	4
ADULT COLLECTION .....	4
Spring Chinook Returns to Rapid River .....	4
Hells Canyon Spring Chinook Returns .....	5
Inventory of Miscellaneous Species .....	5
HARVEST DATA/SPORT AND INDIAN FISHERY .....	5
PRESPAWNING MORTALITY .....	5
CHINOOK SPAWNING .....	7
CARCASS DISPOSITION .....	7
EGG INCUBATION .....	7
FISH PRODUCTION .....	8
Early Rearing .....	8
Final Rearing .....	8
Feed Use and Conversion Data .....	8
FISH HEALTH .....	10
FISH MARKING/CWT DATA .....	10

## TABLE OF CONTENTS (Cont.)

	<u>Page</u>
FISH DISTRIBUTION .....	10
Egg Transfers .....	10
Fingerling Transfers .....	12
Smolt Releases .....	12
ACKNOWLEDGEMENTS .....	15
APPENDICES .....	16

### LIST OF TABLES

Table 1. Rapid River Hatchery production capacity data . . . .	3
Table 2. Rapid River Hatchery rearing/holding area volumes . .	3
Table 3. Water quality analysis, Rapid River, March 1989 . . .	6
Table 4. Inventory of miscellaneous species .....	6
Table 5. Average water temperatures, May through September, 1990 .....	9
Table 6. Survival from green eggs to swim-up fry, brood year 1990 .....	9
Table 7. Initial pond loading densities, June 1991 .....	11
Table 8. Eagle Health Lab disease sample results for brood year 1990 spring chinook .....	11
Table 9. Egg and fingerling transfers from Rapid River Hatchery, brood year 1990 .....	13
Table 10. Rearing densities at time of smolt release, March 1992 .....	13
Table 11. Smolt releases, brood year 1990 .....	14

## LIST OF APPENDICES

		<u>Page</u>
Appendix	1. Fork length data for the 1990 Rapid River spring chinook run .....	17
Appendix	2. Spring chinook length frequency, 1990 .....	18
Appendix	3. Fork length data for the 1990 Rapid River summer chinook run .....	19
Appendix	4. Summer chinook length frequency, 1990 .....	20
Appendix	5. Rapid River adult steelhead length frequency data, 1990 .....	21
Appendix	6. Run timing of spring chinook to the Rapid River trap, 1990 .....	22
Appendix	7. Run timing of spring chinook returns to Rapid River, 1990 .....	23
Appendix	8. Spring chinook egg take information, brood year 1990 .....	24
Appendix	9. Marking/release summary, brood year 1990 .....	25
Appendix	10. Feed and growth information based on data for spring chinook salmon at Rapid River Hatchery, 1980-1990 .	26
Appendix	11. Returns of spring chinook to Rapid River Hatchery, and enumeration of eggs, 1964-1991 .....	27
Appendix	12. Summary of spring chinook returns to Rapid River by brood year .....	28
Appendix	13. Rapid River Hatchery feed use data, brood year 1990 .....	29
Appendix	14. Summary of eggs, fry, fingerlings, and smolts planted from Rapid River Hatchery, 1964-1992 . . . . .	30

## ABSTRACT

The Rapid River adult trap was in operation from March 29 through September 12, 1990. During this time, 2,606 spring chinook Oncorhynchus tshawytscha were collected. This total was comprised of 2,566 adults and 40 jacks. Incidentally, trapped summer chinook, totaling 137 adults and 1 jack, were released back into Rapid River above the hatchery's water intake structure. Additionally, there were 135 adult steelhead Oncorhynchus mvkiss trapped. Of these, 18 were of hatchery origin and 117 were wild. There were no Hells Canyon spring chinook stock transferred to Rapid River Hatchery from the trap below Hells Canyon Dam this year.

Prespawning mortality for Rapid River spring chinook was 12.7% (330 fish). Spawning operations began on August 14 and continued through September 11, 1990. A total of 1,063 females were spawned, who had an average fecundity of 3,967 eggs per female. These fish yielded 4,217,103 green eggs. Survival to eye-up was 92.54%.

Approximately 200,000 excess eyed eggs were transferred to Oregon's Lookingglass Hatchery on October 10, 1990. Nearly 3,641,000 swim-up fry were moved into eight raceways for early rearing during the period of January 30 to March 4, 1991. Excess fingerlings, numbering 403,400 fish, were transported to Sawtooth Hatchery on June 13, 1991. Approximately 3,185,000 fingerlings were moved into final rearing ponds during the period of May 20 to June 13, 1991. Final rearing culminated in the release of 2,615,500 smolts into Rapid River and 500,500 smolts into the Snake River.

Overall feed conversion for 1990 brood year spring chinook salmon was 1.51. The cost per pound of 1990 brood year fish produced at Rapid River Hatchery was \$4.09 (\$0.186 per smolt released).

### Authors:

Tom Levendofske  
Hatchery Superintendent III

Brad Dredge  
Hatchery Superintendent I

Steve Kammeyer  
Fish Culturist

## INTRODUCTION

Rapid River Hatchery was constructed in 1964 by the Idaho Power Company (IPC) as compensation for losses of spring chinook salmon Oncorhynchus tshawytscha resulting from the construction of Brownlee, Oxbow, and Hells Canyon dams on the Snake River. Mitigation, as required by the Federal Energy Regulatory Commission, required that IPC transplant the run of spring chinook from the Snake River to the Salmon River drainage and to provide funds for the production of 3 million spring chinook smolts annually. These fish are designated for release into Rapid River and the Snake River below Hells Canyon Dam.

## LOCATION

Rapid River Hatchery is located in Idaho County, approximately 7 miles (11.2 km) southwest of the community of Riggins, Idaho, on Rapid River, a tributary of the Little Salmon River. Rapid River Hatchery is staffed and operated by the Idaho Department of Fish and Game (IDFG) and is completely funded by IPC.

## OBJECTIVES

The objectives of Rapid River Hatchery are:

1. To produce 3 million spring chinook smolts at an average size of approximately 20 fish per pound (44.1/kg) for release into Rapid River and the Snake River below Hells Canyon Dam.
2. To trap and spawn adult spring chinook salmon returning to Rapid River.
3. To evaluate various strategies and techniques for rearing spring chinook salmon.
4. To provide eggs and/or fry for supplementation purposes.

## FISH REARING/HOLDING FACILITIES

Fish rearing facilities at Rapid River Hatchery consist of 50 double stack Heath incubator trays, 12 outdoor concrete raceways (6 ft x 90 ft), and 2 earthen rearing ponds with concrete side walls: Pond 1AB (84 ft x 199 ft), Pond 2AB (36 ft x 371 ft), and Pond 2CD (36 ft x 371 ft). One concrete adult holding pond (80 ft x 25 ft) and two earthen holding ponds, Adult Pond No. 2 (40 ft x 150 ft), and Adult Pond No. 3 (80 ft x 250 ft) provide space for holding up to 10,000 adult salmon for spawning (Table 1 and 2).

The adult trapping facility, located on Rapid River approximately 1.5 miles (2.4 km) downstream from the hatchery, is equipped with a permanent wooden velocity barrier, a three-step fish ladder, and a two-stage trap. Adult salmon are transferred from the trap to a 1,000-gallon tank truck for transport to the hatchery by means of an Alaska Steep Pass ladder and a 500-gallon bucket operated by an overhead hoist.

Table 1. Rapid River Hatchery production capacity data.

Rearing/Holding Area	Volume	Carrying Capacity
Heath incubators	768 trays	7.7 million eggs
Raceways (12)	1,890 cubic ft	500,000 fry ea.
Rearing Pond No. 1	57,600 cubic ft	1 million smolts
Rearing Pond No. 2	82,000 cubic ft	2 million smolts
Adult Pond No. 1	12,000 cubic ft	1,000 adults
Adult Pond No. 2	24,000 cubic ft	3,000 adults
Adult Pond No. 3	80,000 cubic ft	6,000 adults

Table 2. Rapid River Hatchery rearing/holding area volumes.

Rearing/Holding Area	Volume
Rearing Pond No. 1A	28,800 cubic ft
Rearing Pond No. 1B	28,800 cubic ft
Rearing Pond No. 2A	21,700 cubic ft
Rearing Pond No. 2B	19,300 cubic ft
Rearing Pond No. 2C	19,300 cubic ft
Rearing Pond No. 2D	21,700 cubic ft
Adult Pond No. 1	12,000 cubic ft
Adult Pond No. 2	24,000 cubic ft
Adult Pond No. 3	80,000 cubic ft

## **WATER SUPPLY**

From its origin in Adams County, Rapid River flows through a pristine canyon before reaching the hatchery. Under inclusion in the Wild and Scenic Rivers Act, the Rapid River drainage has not been subject to perturbations, such as logging and road building, and consequently provides an excellent water source for rearing spring chinook. Water quality parameters are listed in Table 3.

Hatchery water is obtained through one 30-inch (76.2 cm) and one 24-inch (61.0 cm) pipeline. A 5-foot (1.5 m) high wooden diversion dam provides the necessary hydraulic head to supply the hatchery with approximately 30 cubic feet per second (cfs) of water. Except for the incubators, all systems operate on gravitational flow. Water for the incubation system is pumped from the headrace by one of two 7.5-horsepower electric pumps. A gasoline-operated backup pump and a filter bed system provide water during electrical failures.

## **STAFFING**

The permanent hatchery staff consists of a Hatchery Superintendent III, a Hatchery Superintendent I, and a Fish Culturist. Approximately five seasonal employees are hired each year from February through November. The Summer Youth Employee Training Program also provides one or two employees to assist with grounds maintenance, etc. Housing accommodations include three residences for the permanent staff and a mobile home for the seasonal employees.

## **ADULT COLLECTION**

### **Spring Chinook Returns to Rapid River**

The adult trapping facility was in operation from March 29 through September 12, 1990. Spring chinook totaling 2,606 (2,566 adults and 40 jacks) were collected between May 7 through August 10, 1990, with the peak of the run occurring June 23-30, 1990.

The sex composition ratio of the run was composed of 1,311 adult males (50.3%), 1,255 females (48.2%), and 40 jacks (1.5%). Age class composition, determined by fork length measurement (Appendix 1), indicated 40 three-year-olds (1.5%), 2,431 four-year-olds (93.3%), and 135 five-year-olds (5.2%).

Spring chinook, including jacks, were given a single subcutaneous injection of water soluble erythromycin phosphate at an average rate of 9 mg active erythromycin per kilogram of fish. Powdered erythromycin phosphate (80% active) was used to make the injectable stock solution. All spring chinook were transported to the hatchery after being injected, checked for injuries, and measured to the nearest centimeter fork length. Scale samples were taken from approximately 200 spring chinook.

Throughout the trapping period, injuries totaling 773 were documented. These injuries were comprised of 62 gaff wounds, 225 nitrogen burns, 298 gill net scars, and 188 injuries of unknown origin. All injuries were treated with a direct application of fungicide to help reduce prespawning mortality. There were 11 trapping/handling mortalities recorded during this season (9 adult males, and 2 females).



Snouts from 205 adipose-clipped coded wire-tagged fish were collected and sent to Lewiston this year. Coded wire tags were found in 3 of the jacks, 182 of the four-year-olds, and 20 of the five-year-old fish. These fish were tagged as part of the US/Canada agreement to determine Idaho's contribution to the ocean harvest.

### **Hells Canyon Spring Chinook Returns**

No spring chinook were transported from the IPC Oxbow/Hells Canyon project this year. Data pertaining to the spring chinook run below Hells Canyon Dam is available in the annual report from the Oxbow Hatchery.

### **Inventory of Miscellaneous Species**

All salmon entering the trap after August 2, 1990 were classified as summer chinook, except for adipose clipped fish. A total of 138 summer chinook (137 adults and 1 jack) entered the Rapid River trap from July 24 through September 5, 1990 (Table 4). The sex composition ratio was 76 adult males (55.1%), 61 females (44.2%), and 1 jack (0.7%). These fish were measured to the nearest centimeter fork length and released back into Rapid River upstream from the hatchery water intake structure. Scale samples were taken from all summer chinook trapped.

From April 5 through June 10, 1990, 135 adult steelhead were trapped and measured to the nearest centimeter fork length. Of the total, 117 were wild fish and 18 were of hatchery origin. The sex composition ratio was 43 adult males and 74 females of wild origin, and 9 adult males and 9 females of hatchery origin. The hatchery fish were transported to the Little Salmon River and released approximately one mile upstream from the confluence with Rapid River. All of the wild steelhead were transported and released back into Rapid River upstream from the hatchery water intake structure. Scale samples were taken from all wild steelhead.

Other species trapped included 255 bull trout Salvelinus confluentus ranging in size from 20 to 61 cm total length, 4 whitefish Coregonus spp, and 3 cutthroat trout Oncorhynchus clarki. These fish were also transported and returned to Rapid River upstream from the hatchery water intake structure.

### **HARVEST DATA/SPORT AND INDIAN FISHERY**

Spring chinook salmon were available for sport and Nez Perce Tribal fisheries during 1990. Creel census data indicated that 579 salmon were taken by the sport fishery and 965 by the Nez Perce Tribe.

### **PRESPAWNINO MORTALITY**

A total of 2,587 spring chinook salmon were held at Rapid River Hatchery this year. This total does not include 11 trap mortalities or 8 uninjected fish sent to the University of Idaho for erythromycin experiments on June 6, 1990. All of these chinook were trapped in Rapid River, with no chinook coming from Hells Canyon. All fish were held in Adult Holding Pond 2.

Table 3. Water quality analysis, Rapid River, March 1989.

Parameter	Suggested range	Observed level
Alkalinity as CaCO <sub>3</sub>	10 - 400	62.0
Dissolved Oxygen	5.0 - saturation	13.0
Ammonia (NH <sub>3</sub> )	< 0.0125	0.003
pH	6.5 - 8.0	7.3
Total Hardness as CaCO <sub>3</sub>	10 - 400	74.0

Table 4. Inventory of miscellaneous species.

Species	Number Trapped
Summer Chinook	138
*Steelhead	135
Bull Trout	255
Whitefish	4
Cutthroat Trout	3

\* Specific data is listed in Table 5.

Prespawning mortality in 1990 was 330 fish (12.7%). BKD lesions were visible on 12 of these fish, accounting for 3.6% of the prespawning mortalities. The prespawning loss sex ratio was comprised of 156 adult males (47.3%), 173 females (52.4%), and 1 jack (0.3%). The cut-off date used for segregating male prespawning mortality was August 27.

Formalin treatments on ponded chinook were conducted from June 4 through August 20 to help control fungus. Treatments with formalin were done three alternating days each week at a concentration of 80-100 ppm. These treatments were very effective in reducing fungal problems. *Throughout* the holding/spawning period water temperatures ranged from 39 to 61°F (Table 5).

#### CHINOOK SPAWNING

During 1990, 1,063 female spring chinook were spawned to produce approximately 4,217,103 green eggs which had an average eye-up rate of 92.54%. Females averaged 3,967 eggs throughout the spawning season. Egg collection began on August 14 and was completed on September 11, 1990. During this time, a total of 19 females were destroyed prior to *spawning* due to poor egg quality, bloody ovarian fluid, symptoms of BKD, etc.

Spawning procedures used in 1990 were conducted to insure a 1:1 ratio of males to females. Spawning methodology started with placing the eggs from two females into a colander to drain off ovarian fluid. The eggs were then transferred to a bucket, fertilized with milt expressed from two males, and then mixed with approximately one cup of well water to activate the sperm. In spawning, 39 of the jacks collected were used at random in the fertilization process. Each bucket of eggs were then water-hardened for 30 minutes in a minimum 100 ppm stock solution of buffered Argentyne. Heath vertical stack incubators were used for incubation.

#### CARCASS DISPOSITION

All non-salvageable carcasses from spawning and daily mortalities were collected twice a week and hauled to a landfill near Grangeville, Idaho, by the Walco Company. A total of 11 salvageable uninjected trapping mortalities were donated to the Riggins food bank on September 14, 1990. Additionally, 8 uninjected adult spring chinook were provided to the University of Idaho for continued experiments with erythromycin.

#### EGG INCUBATION

Beginning on the fourth day of incubation, all egg lots were treated with formalin to minimize fungal development. Treatments were administered three times per week at a 1:600 concentration (1,667 ppm) for 15 minutes and continued until each egg lot accumulated 800 thermal units (TU's).

Eye-up occurred at approximately 500 TU's, at which time all egg lots were shocked and picked using the salt bath flotation method. Volumetric displacement was then used to determine mean egg size and enumerate the eggs. Egg trays were "rodded" weekly after eye-up to remove silt accumulations.

Hatching occurred at approximately 1,000 TU's, at which time all egg lots were picked a second time. All trays were picked a third time when 1,500 TU's had been accumulated to remove any dead yolk-sac fry. Swim-up fry were

transferred to the early rearing raceways at 1,700 to 1,900 TU's. Survival from green eggs to swim-up fry averaged 90.76% (Table 6).

Surplus eyed eggs from Lots 6 and 7, totaling approximately 200,000, were shipped to Oregon's Lookingglass Hatchery on October 10, 1990.

## **FISH PRODUCTION**

### **Early Rearing**

During the period of January 30 through March 4, 1991, approximately 3,641,000 fry were moved out of the incubation building into rearing raceways. Average size at the time of transfer was 1,445 fish per pound. Initial loading densities ranged from 452,135 to 458,395 fish per raceway, with an initial water depth of 1.5 feet and water inflow of 0.9 cfs. As fish size increased, water depth and flows were adjusted to a maximum depth of 3 feet and flow of 1.5 cfs. Density and flow indices were kept below 0.5 and 1.5, respectively, throughout the initial rearing period. Fry size increased to an average size of 2.33 inches (239.74 fish per pound), with a feed conversion of 0.95 during the raceway rearing period.

From March 1 to May 21, 1990, a feed experiment was conducted in the raceways to evaluate fish response to, and resulting conversions from, utilizing BioDry feed in place of BioDiet (semi-moist) feed. Resulting data obtained demonstrated that comparable conversions could be realized using either diet formulation (0.92 BioDiet verses 0.91 BioDry). Average cost of the BioDry diet was significantly lower throughout the course of this experiment (\$0.719/lb BioDiet verses \$0.493/lb BioDry). Some modifications of the automatic feeders was required to utilize the BioDry feed formulation. BioDry diet was not recommended by the manufacturer to be used when medicaments were added (such as gallimycin). It is felt that BioDry diet should be studied in the future, during final rearing, as it would be more conducive to withstanding high air temperatures experienced at the hatchery during the summer months.

### **Final Rearing**

Brood year 1990 fingerlings, totaling approximately 3,185,000 fish, were transferred from the raceways to the final rearing ponds from May 20 through June 13, 1990. Initial pond loading densities are presented in Table 7. Prior to ponding fish, rearing ponds were disinfected with a 200 ppm chlorine bath. The overall feed conversion for brood year 1990 fish was 1.51 at time of release.

### **Feed Use and Conversion Data**

A total of 224,324 pounds of BioProducts feed was used for 1990 brood year fish and fry transfers. This total is comprised of 3,696 pounds of BioDiet feed and 220,628 pounds of BioMoist feed. Specific data on feed types and sizes used is listed in Appendix 3 of this report. The overall feed conversion for 1990 brood year fish was 1.51.

Total costs paid by Idaho Power Company to operate Rapid River Hatchery during the period September 1, 1990 through March 31, 1992 was \$580,728. These costs include fish feed, smolt transportation, fish marking, hatchery personnel salaries, and operation/maintenance costs. No capital outlay expenditures are

Table 5. Average water temperatures, May through September, 1990.

Month	Maximum	Minimum	Average
May	52	39	46.7
June	58	40	48.5
July	60	47	54.2
August	61	50	54.8
September	60	48	52.1

Table 6. Survival from green eggs to swim-up fry, Brood Year 1990.

Green Eggs	Eyed Eggs	Percent Eye-up	Swim-up Fry	% Survival to Swim-up
4,217,103	3,902,385	92.54	*3,646,017	*90.76

\* Swim-up totals do not include 200,000 eyed eggs transferred to Oregon's Lookingglass Hatchery.

\* A total of 200,000 eyed eggs from lots 6 and 7 (100,000 each) were sent to Oregon's Lookingglass Hatchery on October 10, 1990.

included in this total. The resulting cost per pound of 1990 brood year fish produced at Rapid River Hatchery was \$4.09/lb (\$0.186 per smolt released).

#### **FISH HEALTH**

The 1990 juvenile fish reared at Rapid River Hatchery appeared to be healthy through the summer of 1991. During this early rearing period, two medicated feedings of erythromycin were applied for 14 days each.

As the water temperatures dropped in the fall, the incidence of "fuzzy tail" increased. Upon inspection by necropsy, virtually 100% of the moribund fish were showing internal lesions (kidney abscesses) consistent with BKD Renibacterium salmoninarum and external lesions consistent with coldwater disease (CWD) Flexibacter psychrophilus. At this time, the water temperatures were too cold to administer antibiotic therapy. During the course of the fall, winter, and early spring, Rapid River lost approximately 150,000 spring chinook to "fuzzy tail" syndrome. Preliberation samples and organosomatic analysis revealed a portion of the population infected with BKD (Table 8). Most parameters showed that these were normal fish. Strategies will be developed to improve eyes and gill (frayed) quality. ELISA (enzyme linked immunosorbent assay) for BKD showed that six pools (10 fish/pool) were positive out of six pools taken (100%). Three pools had optical densities that were considered high and three pools in the low range.

Rapid River has the potential to improve fish health quality by several actions. As soon as an INAD is available for injecting oxytetracycline into adult chinook, a program to combat prespawning mortality should be implemented utilizing an intraperitoneal route. Oxytetracycline medicated feed should be administered in prophylactic feedings at least twice a growing season. This should help lessen the "fuzzy tail" problem. Erythromycin feeding protocols will be analyzed to provide Rapid River spring chinook the best possible protection. In the near future, either a BKD segregation program or a BKD cull program should be implemented.

All of these fish health related programs should produce a healthier fish by release and a better survival rate to Lower Granite Dam. Each project should be set-up correctly and analyzed thoroughly to ascertain the benefits of each hatchery protocol.

#### **FISH MARKING/CWT DATA**

A portion of the 1990 brood inventory was marked between October 21-26, 1991 in accordance with the US/Canada treaty. These fish will serve as one of the indicators of Idaho's contribution to salmon ocean harvest. Coded wire tags, freeze brands, and passively induced transponders (PIT tags) were used during this project. Overall marking efficiency was 97.54%. Specific tag/release data is presented in Appendix 9.

#### **FISH DISTRIBUTION**

##### **Egg Transfers**

On October 10, 1990, 200,000 excess eyed eggs from two Lots were transferred to Oregon's Lookingglass Hatchery. These eggs were enumerated by volumetric displacement and shipped at 613 and 681 TU's.

Table 7. Initial pond loading densities, June 1991.

Pond	Inflow (cfs)	Millions of fish	Fish per pound	Density index	Flow index
1AB	14.08	1.2	255.03	0.04	0.36
2AB	5.17	1.0	225.58	0.05	0.81
2CD	6.08	1.0	235.40	0.04	0.63

Table 8. Eagle Health Lab disease sample results for brood year 1990 spring chinook.

Case #	Sample Date	Resulting Data
Juvenile samples		
91-57	3/19/91	0/1 viro, 0/4 bacte
91-84	4/ 9/91	0/6 ectoparasites
91-139	5/ 7/91	0/1 BKD, 0/8 bacte
91-172	6/ 3/91	0/1 BKD, 0/4 bacte
91-207	7/11/91	0/6 BKD, 0/4 bacte, 0/60 PW, 0/6 viro
91-221	8/ 6/91	0/1 viro, BKD, PKX
92-14	1/21/92	0/5 viro
92-43	2/19/92	BKD FAT 3/60, 0/60 viro
Brood Samples		
92-255	9/ 3/91	PC: 1/2 pools+, FIBS 0/60, BKD 58/60 (ELISA) 9 high 18 mod, 31 low

### Fingerling Transfers

On June 13, 1991, approximately 403,400 surplus fry were transferred to Sawtooth Hatchery. At the time of transfer, these fish averaged 201.78 fish per pound. Fish were transported at a density of 0.34 pounds per gallon. Specific transfer data is presented in Table 9.

### Smolt Releases

Volitional smolt releases from Rapid River Hatchery began on March 16, 1992, at which time smolts averaged 22.0 fish per pound (121.8 mm fork length). Rearing densities for smolts at time of release is listed in Table 10.

Based on visual observations made, it is estimated that less than 100,000 fish remained in the rearing ponds by March 30, 1992. Smolts after this date were actively seined out of the ponds. The last few thousand fish were netted from pond 1 and pond 2 when they were dewatered on April 7 and 15, respectively. Final pound counts from pond 1 and pond 2, prior to seining fish from the ponds, indicated that they had grown to 17.11 fish per pound (132.5 mm fork length) and 21.56 fish per pound (123.5 mm fork length), respectively. Planting sites and numerical data for brood year 1990 smolts is presented in Table 11.

Idaho Power Company transport tankers outplanted Rapid River stock, numbering 500,500 smolts, into the Snake River directly below Hells Canyon Dam during March 17-19, 1992. These fish averaged 22.69 fish per pound at a fork length size of 137.9 mm. Included in this release was a group of approximately 52,250 marked fish. Marks used included coded wire tags and PIT tags (Appendix 9).



Table 9. Egg and fingerling transfers from Rapid River Hatchery, Brood Year 1990.

Date	Transfer Site	Number Transferred	Size	Total Length (in)
10/10/90	Lookingglass Hatchery	200,000	4.46 egg/ml	
06/13/91	Sawtooth Hatchery	403,400	201.78 fish/lb	2.41

Table 10. Rearing densities at time of smolt release, March 1992.

Pond	Inflow (cfs)	Millions of fish	Fish per pound	Density index	Flow index
1AB	14.21	1.036	20.32	0.16	1.48
2AB	6.04	0.986	22.69	0.20	3.07
2CD	5.43	0.986	23.13	0.20	3.37
2B Catch	6.04	0.055	21.50	0.12	0.18
2C Catch	5.43	0.062	21.50	0.14	0.22

Table 11. Smolt releases, Brood Year 1990.

Date	Plant site	Number released	Fish per pound
Snake River			
03-17-92	Below Hells Canyon Dam	53,900	20.3
03-17-92	Below Hells Canyon Dam	147,100	24.9
03-18-92	Below Hells Canyon Dam	204,200	22.7
03-19-92	Below Hells Canyon Dam	95,300	22.7
Subtotal		500,500	
Rapid River			
03-16-92	Volitional Release Pond 1	993,701	20.3
03-16-92	Volitional Release Pond 2	1,142,520	23.0
03-31-92	Fish Flushed Pond 1	103,550	20.3
03-31-92	Fish Flushed Pond 2	375,729	23.0
Subtotal		2,615,500	
HATCHERY TOTAL		3,116,000	

## **ACKNOWLEDGEMENTS**

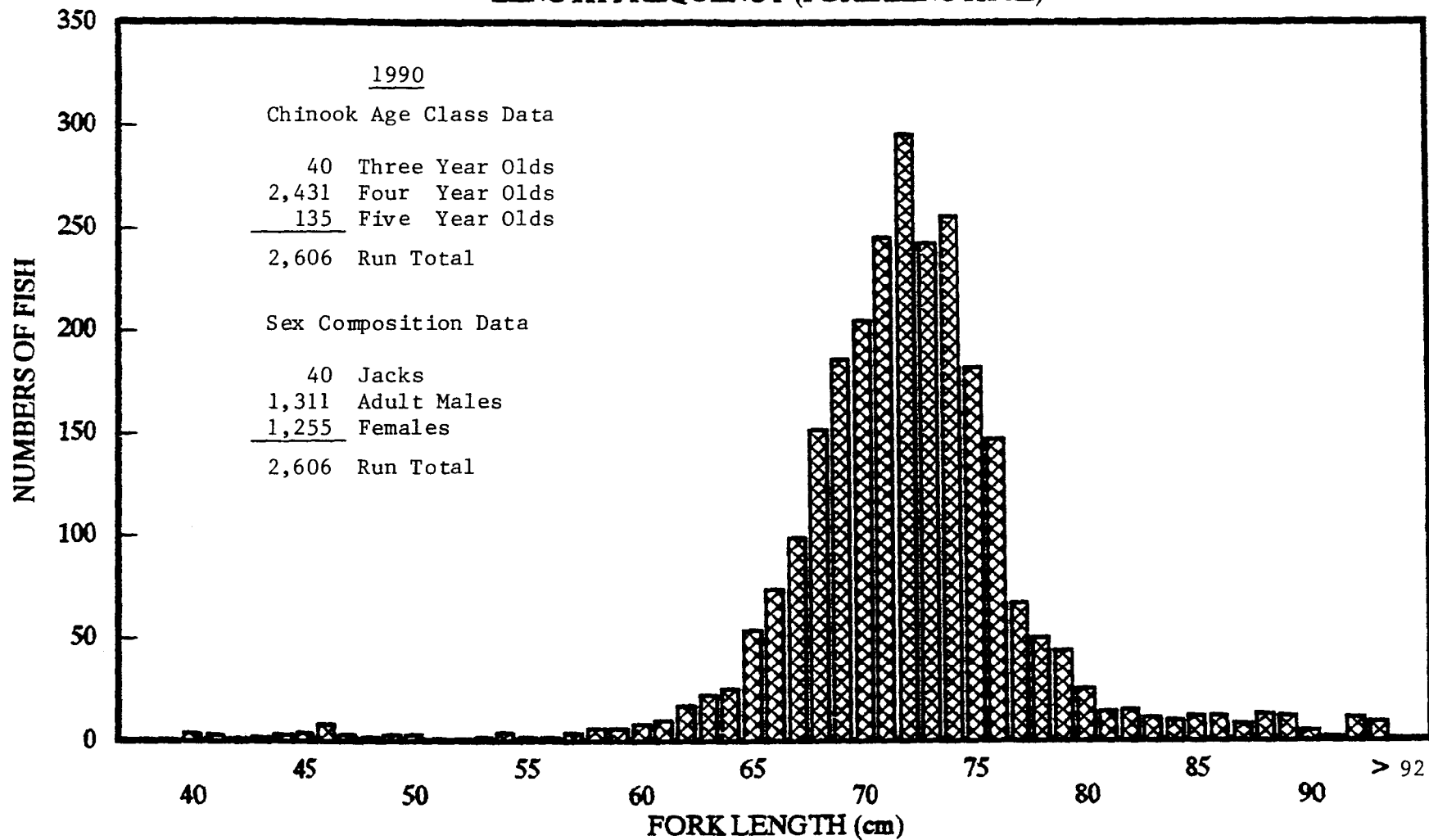
The crew at Rapid River Hatchery would like to thank Paul Abbott and the entire fisheries staff at Idaho Power Company for their support and assistance in helping us maintain and improve the hatchery facility. We would also like to thank personnel from other IDFG hatcheries (especially Doug Young) and U.S. Forest Service personnel who helped us take eggs during the spawning season. Our gratitude goes to thank Roy Kinner and other area conservation officers for helping with enforcement problems at the hatchery and for security at the trapping facility. Thanks is also offered to Larry Basham for compiling tag/brand retention data on the 1990 brood year smolts. In addition, we would like to extend our appreciation to Doug Munson and the Eagle Lab pathology staff for doing disease diagnostic work at the hatchery.

## **A P E N D I C E S**

Appendix 1. Fork length data for the 1990 Rapid River  
spring chinook run.

Fork Length (cm.)	Number of Fish	Fork Length (cm.)	Number of Fish
Less than 40	0	80	25
40	4	81	14
41	3	82	15
42	1	83	11
43	2	84	10
44	3	85	12
45	4	86	12
46	8	87	8
47	3	88	13
48	2	89	12
49	3	90	5
50	3	91	2
51	1	92	11
52	1	Greater than 92	9
53	2		
54	4	Run Total	2,606
55	2		
56	2		
57	4	Sex Composition Data	
58	6		
		40 Jacks	
59	6		
60	8	1,311 Adult Males	
61	10	<u>1,255 Females</u>	
62	17	2,606 Run Total	
63	22		
64	25		
65	54	Chinook Age Class Data	
66	74		
		40 Three Year Olds	
67	99		
68	152	2,431 Four Year Olds	
69	186	<u>135 Five Year Olds</u>	
70	205	2,606 Run Total	
71	246		
72	296		
73	243	Age Determination Structure	
74	256		
		0 - 53 cm = Three Year Old	
75	182		
76	147	54 - 80 cm = Four Year Old	
77	67	81 - > cm = Five Year Old	
78	50		
79	44		

LENGTH FREQUENCY (FORK LENGTH cm)



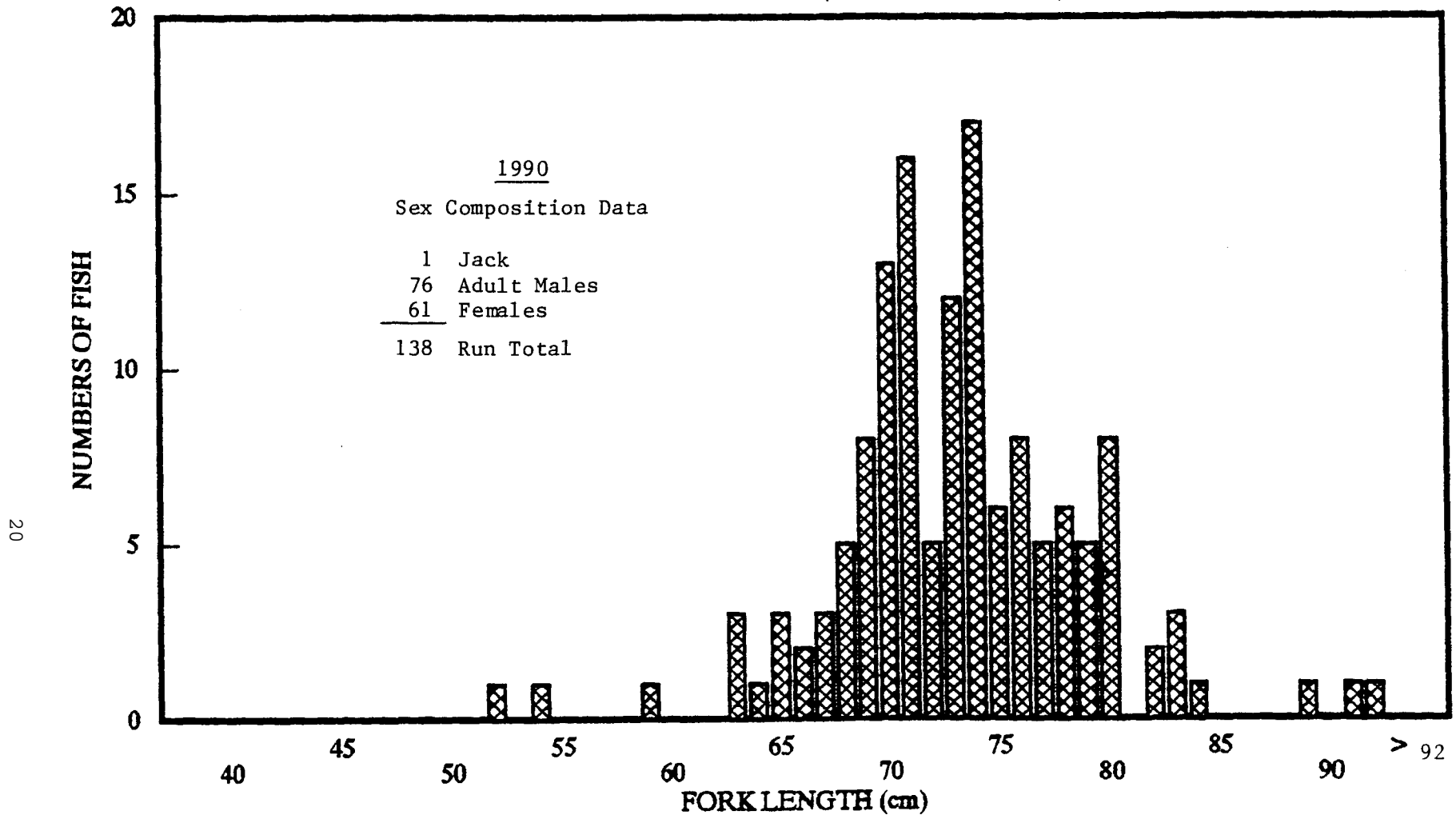
Appendix 2. Spring chinook length frequency, 1990.

Appendix 3. Fork length data for the 1990 Rapid River  
summer chinook run.

Fork Length (cm.1)	Number of Fish	Fork Length (cm.1)	Number Fish
Less than 40	0	80	8
40	0	81	0
41	0	82	2
42	0	83	3
43	0	84	1
44	0	85	0
45	0	86	0
46	0	87	0
47	0	88	0
48	0	89	1
49	0	90	0
50	0	91	1
51	0	92	1
52	1	Greater than 92	0
53	0		
54	1	Run Total	138
55	0		
56	0		
57	0	Sex Composition Data	
58	0		
		1 Jacks	
59	1		
60	0	76 Adult Males	
61	0	61 Females	
62	0	138 Run Total	
63	3		
64	1		
65	3		
66	2		
67	3		
68	5		
69	8		
70	13		
71	16		
72	5		
73	12		
74	17		
75	6		
76	8		
77	5		
78	6		
79	5		

# RAPID RIVER SUMMER CHINOOK - 1990

## LENGTH FREQUENCY (FORK LENGTH cm)



Appendix 4. Summer chinook length frequency, 1990.



Appendix 5. Rapid River adult steelhead length frequency data, 1990.

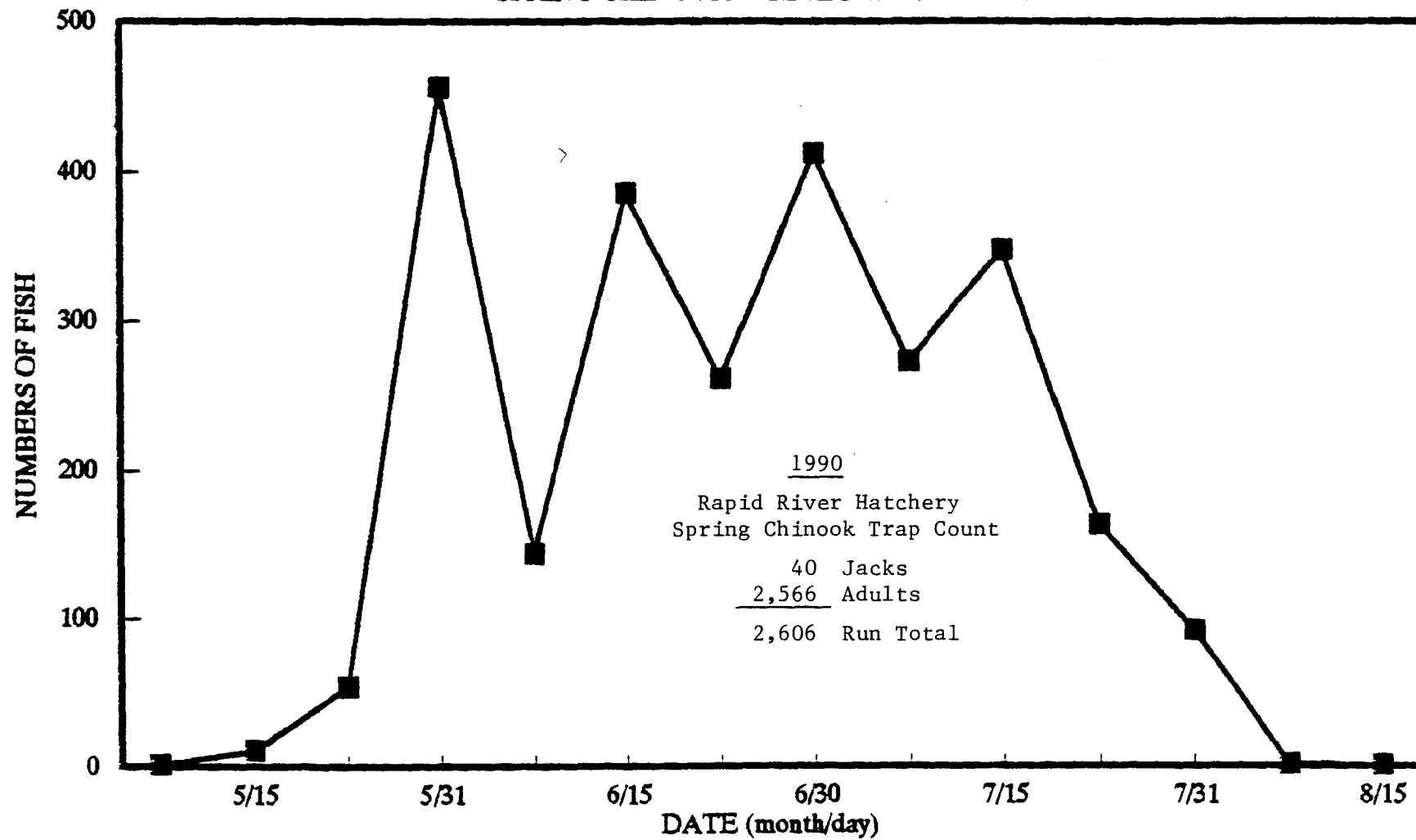
Fork Length (cm)	Hatchery Origin		Wild Origin	
	Male	Female	Male	Female
53	1			
54			1	
55				
56		1		
57				
58				
59	1	1		
60				1
61				2
62	4	1		2
63		2	2	1
64			1	
65			1	1
66			4	1
67			1	2
68			1	
69	1			1
70	1		1	
71		1	2	
72				3
73			2	4
74			3	2
75			2	7
76				9
77			1	10
78			2	9
79			2	9
80		1	1	4
81		1	1	2
82			3	1
83	1		1	2
84		1	5	
85			2	1
86			1	
87				
88			2	
89				
90				
91				
92			1	
SUBTOTALS	9	9	43	74
TOTALS (MALE & FEMALE)		18		117

Appendix 6. Run timing of spring chinook to the Rapid  
River trap, 1990.

	DATE	NUMBERS OF FISH	% OF TOTAL RUN
MAY	1 - 7	2	0.08
	8 - 15	11	0.42
	16 - 22	54	2.07
	23 - 31	457	17.54
JUNE	1 - 7	144	5.53
	8 - 15	386	14.81
	16 - 22	261	10.02
	23 - 30	412	15.81
JULY	1 - 7	273	10.48
	8 - 15	348	13.35
	16 - 22	163	6.25
	23 - 31	92	3.53
AUG.	1 - 7	2	0.08
	8 - 15	1	0.04
RUN TOTAL		2,606	

# RAPID RIVER CHINOOK TRAPPING - 1990

## SPRING CHINOOK WEEKLY TRAP COUNT



Appendix 7. Run timing of spring chinook returns to Rapid River, 1990.

Appendix 8. Spring chinook egg take information, Brood Year 1990.

Lot	Date Spawned	Number Females	Green Eggs	Eggs per Female	Number Eyed	Percent Eye-up	Second Pick	Eggs/Fry Remaining
1	08/14	4	17,250	4,313	14,875	86.23	141	14,734
2	08/21	36	145,797	4,050	133,515	91.58	960	132,555
3	08/24	136	532,247	3,914	499,797	93.90	7,796	492,001
4	08/28	387	1,571,861	4,062	1,465,388	93.23	17,628	1,447,760
5	08/31	292	1,105,274	3,785	1,032,735	93.44	21,104	1,011,631
*6	09/04	160	656,938	4,106	589,838	89.79	7,714	482,124
*7	09/07	38	158,886	4,181	141,737	89.21	510	41,227
8	09/11	10	28,850	2,885	24,500	84.92	515	23,985
Totals:		1,063	4,217,103	3,967	3,902,385	92.54	56,368	3,646,017

---

\*A total of 200,000 eyed eggs from lots 6 and 7 (100,000 each) were sent to Oregon's Lookingglass Hatchery on October 16, 1990.

Appendix 9. Marking/release summary, Brood Year 1990.

Date	Released	Tag type	Tag code	Tags released	Site released
3/17	3/31/92	CWT	10/35/01	66,905	Rapid River
3/17	3/31/92	CWT	10/35/02	66,741	Rapid River
3/17	3/31/92	CWT	10/35/03	60,448	Rapid River
3/17	3/31/92	CWT	10/35/04	65,906	Rapid River
3/17	3/31/92	CWT	10/35/03	19,858	Rapid River
		& FB	RA-R-1		
3/17	3/31/92	CWT	10/35/03	19,536	Rapid River
		& FB	RA-R-2		
3/17	3/31/92	CWT	10/35/03	21,842	Rapid River
		& FB	RA-R-3		
3/17	3/31/92	PIT		279	Rapid River
3/17/92		CWT	10/35/05	51,981	Hells Canyon
3/17/92		PIT		268	Hells Canyon
Total				373,764	

Appendix 10. Feed and growth information based on data for spring chinook salmon at Rapid River Hatchery, 1980-1990.

Month	Ave water temp (F)	Density index	Flow index	Feed conv.	Hatchery constant	Ave daily length inc.	Monthly length inc.	Condition factor	X body weight fed	Number feeding per day	Ave. f/lb at end of month	Ave. length at end month
Feb	38	n/a	n/a	3.00	1.98	0.0022	0.07	0.00026	1.42	8	1,084	1.53
Mar	41	0.25	0.54	1.30	2.85	0.0073	0.22	0.11128	1.89	8	847	1.62
Apr	44	0.28	0.50	1.00	3.50	0.0117	0.35	0.00030	2.40	8	461	1.93
May*	46	0.28	0.68	2.00	4.80	0.0080	0.24	0.00032	2.30	8	293	2.25
Jun	48	0.07	0.76	1.19	7.50	0.0210	0.63	0.00033	2.93	4	141	2.87
Jul	53	0.09	0.87	1.56	7.49	0.0160	0.48	0.00033	2.75	4	79	3.48
Aug	54	0.12	1.39	1.61	8.21	0.0170	0.51	0.00035	2.70	5	49	3.88
Sep	50	0.14	1.60	1.55	9.00	0.0170	0.51	0.00035	2.00	5	36	4.30
Oct	46	0.16	1.64	2.17	6.05	0.00093	0.28	0.00035	1.37	3	30	4.57
Nov	41	0.17	1.87	3.71	1.89	0.0017	0.05	0.00035	0.41	2	29	4.62
Dec	38	0.16	1.90	4.50	0.95	0.0007	0.00	0.00035	0.21	1	30	4.57
Jan	37	0.18	1.95	4.50	0.95	0.0007	0.00	0.00035	0.21	1	30	4.57
Feb	38	0.18	2.10	2.50	2.48	0.0033	0.10	0.00032	0.53	2	27	4.87
Mar	41	0.19	1.95	1.80	4.48	0.0083	0.25	0.00032	0.92	2	23	5.14

\*Growth data may vary during periods of high water.

Appendix 11. Returns of spring chinook to Rapid River Hatchery, and enumeration of eggs, 1964-1991.

Return year	Snake River return (adults)	Rapid River return (adults)	Rapid River return (jacks)	Percent prespawn mortality	Females spawned	Eggs/female	Number of eggs taken
1964	349			16	182	4,874	887,000
1965	408			21	133	4,541	604,000
1966	1,511			18	621	3,697	2,296,000
1967	974		1,039	11	581	3,537	2,055,000
1968	351	3,416	740	2	1,809	3,671	6,540,000
1969	672	2,817	1,043	8	1,415	3,655	5,151,697
1970		6,470	887	10	3,520	4,136	14,560,280
1971		3,357	1,754	19	1,722	3,507	6,038,785
1972		12,310	943	15	3,825	3,941	15,072,604
1973		17,054	286	37	3,454	3,912	13,510,465
1974		3,457	538	27	1,756	3,924	6,890,186
1975		4,428	573	7	2,184	3,894	8,503,606
1976		6,342	1,765	15	3,055	3,762	11,492,878
1977		7,767	437	11	3,781	3,745	14,160,330
1978		5,735	34	21	2,350	4,266	10,026,888
1979		3,054	350	31	1,141	4,950	5,648,722
1980		1,528	432	30	543	3,235	1,756,827
1981		3,087	176	7	1,666	3,675	6,122,273
1982		3,646	30	11	1,883	3,973	7,482,330
1983		1,864	94	15	859	4,015	3,449,471
1984		1,705	651	7	821	3,807	3,125,911
1985	673	6,376	351	8	2,962	3,741	11,535,461*
1986	360	6,546	177	34	2,451	4,355	10,673,138*
1987	534	3,808	210	30	1,133	4,379	5,656,145*
1988	381	3,608	172	19	1,645	4,879	7,905,702*
1989	86	2,372	428	11	1,082	4,139	4,478,045*
1990		2,566	40	13	1,063	3,967	4,217,103
1991		1,675	238	10	657	3,886	2,553,218

\* Includes eggs taken from Hells Canyon adults.

Appendix 12. Summary of spring chinook returns to Rapid River by brood year.

Brood year	Year released	Number released	3-yr olds	Year returned	4-yr olds	Year returned	5-yr olds	Year returned	Total brood year return	Percent return from plant
1964	1966	588,000	1,309	1967	3,422	1968	197	1969	4,658	0.80
1965	1967	479,267	740	1968	2,620	1969	874	1970	4,234	0.89
1966	1968	1,460,150	1,043	1969	5,596	1970	364	1971	7,003	0.48
1967	1969	900,192	887	1970	2,992	1971	1,544	1972	5,416	0.60
1968	1970	3,172,000	1,754	1971	10,766	1972	4,403	1973	16,923	0.53
1969	1971	2,718,720	943	1972	12,654	1973	1,759	1974	15,356	0.56
1970	1972	2,809,200	285	1973	1,698	1974	386	1975	2,370	0.08
1971	1973	2,908,425	538	1974	4,206	1975	1,120	1976	5,864	0.20
1972	1974	2,707,917	573	1975	5,222	1976	634	1977	6,429	0.24
1973	1975	3,373,700	1,765	1976	7,110	1977	1,845	1978	10,720	0.32
1974	1976	3,358,940	437	1977	3,890	1978	2,413	1979	6,740	0.20
1975	1977	2,921,172	34	1978	598	1979	46	1980	678	0.02
1976	1978	2,413,678	350	1979	1,482	1980	146	1981	1,978	0.08
1977	1979	2,866,993	432	1980	,068	1981	557	1982	4,057	0.14
1978	1980	2,604,823	176	1981	3,089	1982	1,206	1983	4,291	0.16
1979	1981	2,372,607	30	1982	838	1983	356	1984	1,224	0.05
1980	1982	1,473,733	94	1983	1,349	1984	199	1985	1,642	0.11
1981	1983	2,998,103	651	1984	6,177	1985	1,456	1986	8,284	0.28



Appendix 12. Continued.

Brood year	Year released	Number released	3-yr olds	Year returned	4-yr olds	Year returned	5-yr olds	Year returned	Total brood year return	Percent return from plant
1982	1984	3,246,197	351	1985	5,0990	1986	1,155	19987	6,596	0.20
1983	1985	2,491,238	177	1986	2,444	1987	1,557	1988	4,178	0.17
1984	1986	1,594,688	210	1987	2,051	1988	379	1989	2,640	0.17
1985	1987	2,836,400	172	1988	1,933	1989	135	1990	2,300	0.08
1986	1988	2,630,200	428	1989	2,431	1990	421	1991	3,280	0.12
1987	1989	2,319,500	40	1990	1,254	1991	161	1992	1,455	0.06
1988	1990	2,770,400	238	1991	2,209	1992		1993		
1989	1991	2,675,000	%	1992		1993		1994		
1990	1992	2,615,500		1993		1994		1995		

Appendix 13. Rapid River Hatchery feed use data, Brood Year 1990.

Feed Size	Type	Pounds
No. 2 Starter	BioDiet	968
No. 3 Starter	BioDiet	2,728
1.0 mm (1/32")	Galli Med	3,408
1.3 mm (3/32")	BioMoist	6,900
1.5 mm (1/16")	BioMoist	17,100
2.5 mm (3/32")	BioMoist	46,500
3.0 mm (1/8 ")	BioMoist	127,920
	Ery Med	18,800
HATCHERY TOTAL		*224,324

\* This number represents the entire amount of feed purchased for Rapid River Hatchery brood year 1990 production and for stock reared at Rapid River Hatchery and outplanted as fry/fingerling releases.

Appendix 14. Summary of eggs, fry, fingerlings, and smolts planted from Rapid River Hatchery 1964-1992.

Brood Year	No. Eggs Taken	Egg, Fry Plants & Site			Smolt Plants & Site		Fish/Pound
1964	887,000	None			588,000	Rapid River	22.6
1965	604,000	None			479,267	Rapid River	23.2
1966	2,296,000	None			1,460,150	Rapid River	25.0
1967	2,055,000	None			900,192	Rapid River	24.0
1968	6,540,000	757,376	eggs,	Clearwater Hatchery Chan	3,172,000	Rapid River	20.0
1969	5,171,697	497,000	eggs,	Dworshak NFH to start Kooskia NFH	2,718,720	Rapid River	21.0
1970	14,560,280	4,417,454 2,224 526,516 2,473,983 4,607,736 200,520 353,970 100,000	eggs, eqqs, eggs, eggs, eggs, fry, fry, fry,	Sweetwater Eye Stat. Kooskia NFH Hayden Ck. Hatchery Clearwater Hatchery Chan Rapid River Hatchery Lemhi River Decker Pond Sandpoint Hatchery	2,809,200 91,800	Rapid River Lochsa River	19.4
1971	6,038,785	600,000	eggs,	Hayden Ck. Hatchery	197,303	SF Clearwater River	17.0
		53,562	fry,	Lemhi River	2,908,425	Rapid River	
		104,300	fry,	Red River			
		29,800	fry,	Ten Mile Creek			
		44,700	fry,	American River			
		14,900	fry,	Papoose Creek			
		59,600	fry,	Brushy Creek			
		44,700	fry,	Fish Creek			
		14,900	fry,	Post Office Creek			
		44,700	fry,	Squaw Creek (Lochsa)			
		61,500	fry,	Lochsa River			
		60,000	fry,	Ten Mile Creek			
		200,880	fry,	Sandpoint Hatchery			
		401,305	fry,	Decker Pond			
1972	15,072,604	5,256,662 3,012,358 1,293,592 4,878,017	eggs, eqqs, eggs, eggs,	Sweetwater Eye Stat Hayden Creek Hatchery Red River H Chan Rapid River Hatchery	2,707,917	Rapid River	17.5
1973	13,510,464	3,915,900 1,295,424 104,760 502,200 702,000 806,400 504,000 210,734 206,360 88,480 18,200 633,000 10,428	eggs, eggs, eggs, eggs, eggs, eggs, eggs, fry, fry, fry, fry, fry, fry, fry,	Sweetwater Eye Stat. Hayden Creek Hatchery Hagerman Hatchery Crooked River H Chan Kooskia NFH Hayden Creek Hatchery Minnesota-walleye trade Sandpoint Hatchery Kooskia Hatchery Ten Mile Creek Newsome Creek Lemhi River Capehorn Creek	117,000 3,373,700	SF Clearwater Rapid River	14.8
1974	6,890,186	809,400 407,012 5,203,273 203,500 21,840 59,962 30,750 10,250 1,140,300	eggs, eggs, eggs, fry, fry, fry, fry, fry, fry,	Hayden Creek Hatchery Indian Creek Rapid R.Hatchery Sandpoint Hatchery Capehorn Creek Red River Newsome Creek Ten Mite Creek Lemhi River	205,700 3,358,940	SF Clearwater Rapid River	18.4

## Appendix 14. Continued.

Brood Year	No. Eggs Taken	Ego. Fry Plants & Site	Smolt Plants & Site	Fish/Pound
1975	8,503,606	2,363,200 eggs, Sweetwater Eye Stat 252,200 Mullen Hatchery 255,000 eggs, Hayden Creek Hatchery 280,659 eggs, Indian Creek H Chan 4,906,492 eggs, Rapid River Hatchery 34,000 fry, Ten Mile Creek 156,000 fry, Lemhi River 65,960 fry, SF Clearwater River 412,800 fry, Decker Pond 209,950 fry, Sandpoint Hatchery 36,143 fry, Bear Valley Creek	249,750 SF Clearwater 2,921,172 Rapid River	15.9
1976	11,492,878	1,161,608 eggs, Mullen Hatchery 2,937,994 eggs, Sweetwater Eye Stet. 261,900 eggs, Hayden Creek Hatchery 261,900 eggs, Sandpoint Hatchery 1,267,208 eggs, Mackay Hatchery 5,009,482 eggs, Rapid River Hatchery 47,008 fry, Univ of Idaho, Fish Coop. 311,850 fry, Mackay Hatchery 104,500 fry, Lolo Creek 501,600 fry, Red River Pond 80,600 fry, SF Clearwater River	2,413,678 Rapid River	15.7
1977	14,160,330	2,633,400 eggs, Sweetwater Eye Stat. 2,287,800 eggs, Kooskia NFH 2,689,000 eggs, Mullen Hatchery 288,000 eggs, Hayden Creek Hatchery 20,700 eggs, Univ of Idaho 1,007,340 eggs, Crooked River H Chan 5,098,587 eggs, Rapid River Hatchery 723,000 fry, Mackay Hatchery 50,800 fry, Decker Pond 200,025 fry, Red River Pond 265,600 fry, Lemhi River	2,866,993 Rapid River 156,362 white Sand 44,373 Newsome Creek	15.0
1978	10,026,888	767,322 Hayden Creek Hatchery 970,728 Mackay Hatchery 1,540,282 Sweetwater Eye Stet. 706,936 eggs, Dworshak NFH 38,160 eggs, Univ of Idaho 10,864 Univ of Idaho (Hayden Ck.) 1,250,010 Crooked River H than 249,969 eggs, Sweetwater Eye Stet. 232,500 fry, Red River Pond 10,000 fry, Ten Mile Creek	57,440 White Sand 2,604,823 Rapid River	15.0
1979	5,646,722	806,400 Hayden Creek Hatchery 330,880 eggs, Dworshak NFH 293,249 fry, Red River Pond	1,001,700 Snake River 2,372,607 Rapid River	21.0 17.9
1980	1,756,827	None	1,473,733 Rapid River	28.0
1981	6,122,273	608,384 eggs, Pahsimeroi Hatchery 256,608 eggs, Oxbow Hatchery 449,280 eggs, Dworshak NFH 4,409,036 eggs, Rapid River Hatchery	250,020 Snake River 2,998,103 Rapid River	27.0 22.0
1982	7,420,450	493,346 eggs, Lookingglass (Ore) 1,332,000 eggs, Pahsimeroi Hatchery 375,028 eggs, Dworshak NFH 125,055 eggs, Hagerman NFH 4,614,863 eggs, Rapid River Hatchery 306,000 fry, Red River Pond	500,850 Snake River 3,246,197 Rapid River	27.0 20.0
1983	3,449,471	None	437,360 Snake River 2,491,238 Rapid River	27.0 23.0

Appendix 14. Continued.

Brood Year	No. Eggs Taken		Ego. Fry Plants &		Smolt Plants & Site		Fish/Pound
1984	3,125,911(RR)	152,000	fry,	Red River	140,000	Snake River	20.0
	217,181(Red R)				136,800	Red River	30.0
					1,594,688	Rapid River	22.0
1985	11,535,461	497,520	eggs,	Oregon	103,000	Snake River	31.1
		3,668,000	eggs,	Dworshak NFH	2,836,400	Rapid River	22.5
		2,450,907	eggs,	Sawtooth Hatchery			
		100,590	fry,	Boulder Creek			
		349,650	fry,	Crooked River			
		200,158	fry,	Eldorado Creek			
		55,123	fry,	Hopeful Creek			
		144,443	fry,	Crooked Fork			
		70,282	fry,	White Sands Creek			
		49,437	fry,	Ten Mile Creek			
		102,282	fry,	Newsome Creek			
		115,352	fry,	Brushy Fork			
1986	10,673,138	2,368,400	eggs,	Dworshak NFH	400,600	Snake River	19.8
		712,905	eggs,	Sawtooth Hatchery	2,630,200	Rapid River	19.2
		7,591,833	eggs,	Rapid River Hatchery			
		348,600	fry,	Crooked Fork			
		202,400	fry,	White Sand Creek			
		98,000	fry,	Big Flat Creek			
		238,900	fry,	Red River Pond			
1987	5,656,145	30,000	fry,	Little Salmon River	500,000	Snake River	20.0
		103,800	fry,	LoLo Creek	2,319,500	Rapid River	22.0
		53,200	fry,	El Dorado Creek			
		137,800	fry,	Crooked Fork Creek			
		62,200	fry,	Hopeful Creek			
		108,300	fry,	White Sand Creek			
		72,200	fry,	Big Flat Creek			
		19,500	fry,	White Sand Creek			
		113,800	fry,	American River			
		112,100	fry,	Newsome Creek			
		100,100	fry,	Meadow Creek			
		200,100	fry,	Crooked River			
		50,100	fry,	Red River			
		50,100	fry,	Yankee Fork			
		202,000	fry,	Brushy Fork			
		150,100	fry,	Ten Mite Creek			
		100,200	fry,	White Sand Creek			
1988	7,881,379	1,475,677	eggs,	Oregon F&G	551,200	Snake River	30.0
		149,570	fry,	Little Salmon River	250,000	L. Salmon	27.8
		100,278	fry,	Ten Mile Creek	2,520,400	Rapid River	26.0
		149,570	fry,	Little Salmon River			
		100,278	fry,	Ten Mile Creek			
		101,062	fry,	Crooked River			
		100,862	fry,	Crooked River			
		100,628	fry,	Newsome Creek			
1988		100,299	fry,	Boulder Creek			
		100,342	fry,	Boulder Creek			
		100,097	fry,	Newsome Creek			
		195,398	fry,	Brushy Fork			
		99,919	fry,	White Sands Creek			
		100,148	fry,	White Sands Creek			
		99,401	fry,	American River			
		51,369	fry,	American River			
		39,163	fry,	Meadow Creek			
1989	3,925,585	211,209	fry,	Crooked River	500,500	Snake River	22.5
		548,876	fry,	Sawtooth Hatchery	100,100	L. Salmon	22.5
					2,564,900	Rapid River	24.2
1990	4,217,103	200,000	eggs,	Lookingglass Hatch.	500,500	Snake River	20.3
		403,400	fry,	Sawtooth Hatchery	2,615,500	Rapid River	20.3

Submitted by:

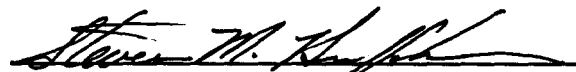
Tom Levendofsky  
Fish Hatchery Superintendent III

Brad Dredge  
Fish Hatchery Superintendent I

Steve Kammeyer  
Fish Culturist

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

  
Steven M. Huffaker, Chief  
Bureau of Fisheries

  
Bill Hutchinson  
Fish Hatcheries Manager